SPECIFICATION

Staple Gun Apparatus for Attaching Tab

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Cross Reference to Other Patent Applications

[0001] This invention claims priority under 35 U.S.C. § 119 to U.S. provisional patent application serial number 60/402,303 filed August 9, 2002, which is incorporated by reference in its entirety.

Background of the Invention

[0002] This invention relates to a staple gun and will have specific reference to a staple gun for attaching tabs or labels to wood products and the like.

[0003] It is becoming common place for lumber companies and mills to use labels bearing bar codes, commonly referred to as UPC labels, for inventory control and computer pricing. Previously such labels were attached by a user carrying a roll of the UPC labels placing one against the board, stapling it to the board and then severing the stapled label from the remainder of the roll. This process, when performed by hand, is very time consuming which increases the price of lumber to the consumer.

[0004] Lumber is often shipped great distances and stored in harsh environmental conditions for extended periods of time. In particular, the lumber may be left on sea docks or in open lumberyards for months at a time. During these periods the lumber is subject to harsh environmental conditions such as rain, snow and high winds, and other conditions such as pollution and bird droppings. During transit on trains or on open semi-tractor trailers, the lumber units may be subjected to flying debris such as small sticks and stones, which may hit the lumber at speeds of seventy miles an hour. Due to the high cost of lumber, and in order to minimize the damage done to the lumber during transport and storage, it is desirable to protect the lumber from exposure to these harsh environmental conditions.

[0005] Lumber units, which are shipped in a variety of sizes, typically are wrapped

in a protective covering, such as Nova-Thene Plus TP (Trademark owned by Intertape Polymer Group of Nova Scotia, Canada), a high strength, lightweight coated fabric consisting of a reinforcing high density polyethylene scrim coated on both sides with a film of low density polyethylene blended with other specialty resins. The protective covering typically is secured to the lumber unit by fasteners such as staples that are shot from a staple gun through the covering and into the lumber. The staple typically retains the sheeting on the lumber unit during transport and storage but must be removed prior to sale or use of the lumber.

[0006] When covered lumber unit is subjected to high winds, the high winds may tend to tear the protective covering from the lumber unit due to the small surface area of the staple in contact with the cover. In other words, as the covering is pulled from the lumber, the staples tend to tear through the cover (termed staple "pull through"). Moreover, during purposeful removal of the covering from the lumber prior to use, pulling of the covering from the lumber tends to result in the staple tearing through the cover such that the staples remain in the lumber. When staples remain in the lumber, the staples may damage or destroy saw blades used to cut the lumber. Partially removed staples with a single leg remaining in the product ("leg-out" condition) are also hazardous to personnel who may be injured from the protruding staple leg. In addition, staples left remaining in the lumber mar the appearance of the lumber and decrease the value of expensive specialty lumbers.

[0007] One solution is to secure the protective cover to the lumber by use of a polymeric tab, stapled through the covering into the product. Tabs are used to distribute strain on the protective covering. This reduces staple pull throughs providing for a stronger and more durable covering. The tabs can be imprinted with the company's trademark, safety designation, product information, etc. During purposeful removal of the cover, the tabs and staples normally come free. Experience has shown that 95% to 100% of the staples will be thus removed when tabs are used.

[0008] Presently the tabs are separately positioned and stapled. This results in higher labor expenditures and requires two-handed operation. Because the

protective covering must also be held in position during the stapling process, two workers are typically required (first worker holds the covering in place, second worker positions and staples tab).

[0009] When only a single worker is available, the awkwardness of affixing a tab is quickly apparent. First the covering is brought into position and a tab positioned. The worker uses one hand to both hold the tab in position as well as holding the covering in position then uses the other hand to operate the staple gun. This awkwardness leads to many poorly covered products as either the covering or tab slips before the staple is driven. Worker injuries also occur when staple guns are engaged prematurely or staples penetrate into the hand holding the tab in position.

[0010] It is therefore desirable to reduce the labor requirements, injuries and awkwardness of affixing tabs and labels to lumber and products covered with protective coverings.

Brief Summary of the Invention

[0011] This invention eliminates the above problems by providing a highly compact staple gun accessory capable of carrying and feeding a group of labels or tabs. The accessory feeds and holds a single label when the staple gun is pressed against the product. The positioning is situated so that the label or tab is held between the staple gun head and the product. When the gun trigger is pulled a staple is driven from the staple gun, in common manner, through the label or tab into the product. Typically, the gun will then be positioned at a second area of the label or tab and a second staple will be driven through the label or tab into the product. The staple gun will then be retracted away from the surface of the product.

[0012] In one embodiment, each time the staple gun is brought in contact with the product, a new label or tab is fed into position automatically. In this manner, labels or tabs are positioned and affixed to a product in a single-handed operation. The staple gun accessory is highly compact thus reducing user fatigue associated with heavy and bulky staple gun accessories.

[0013] Other objects of this invention will become apparent upon a reading of the following description taken with the accompanying drawings.

Brief Description of the Drawings

[0014] **Figure 1** illustrates one embodiment of the invention depicting major components;

[0015] **Figure 2** illustrates one embodiment of the invention depicting major components and identifying dimension "A";

[0016] **Figures 3A and 3B** illustrate various views of an embodiment of the invention identifying components;

[0017] **Figure 3C** illustrates one embodiment of the invention depicting insertion of a tab magazine or label magazine into the dispenser housing;

[0018] **Figures 4A, 4B, 4C and 4D** illustrate various views of an embodiment of a tab magazine or label magazine;

[0019] **Figure 5A** illustrates use of one embodiment of the present invention;

[0020] **Figure 5B** illustrates a tab affixed to a product with a first and a second staple;

[0021] **Figure 6** illustrates another embodiment of a tab and label feeding attachment;

[0022] **Figure 7A** illustrates the tab and label feeding attachment of **Figure 6** with one of the retaining covers removed;

[0023] **Figure 7B** illustrates a housing structure of the tab and label feeding attachment of **Figure 6;**

[0024] **Figure 7C** illustrates a retaining covers of the tab and label feeding attachment of **Figure 6;**

[0025] **Figure 7D and Figure 7E** illustrate a tab and label pressure spring of the tab and label feeding attachment of **Figure 6;**

[0026] **Figure 7F** illustrates a front housing structure of the tab and label feeding attachment of **Figure 6;**

[0027] **Figure 8A** illustrates a tab and label feeding means of the tab and label feeding attachment of **Figure 6;**

[0028] **Figure 8B** illustrates an indexing slide of the tab and label feeding attachment of **Figure 6;**

[0029] **Figure 8C** illustrates an indexing slide assembly of the tab and label feeding attachment of **Figure 6;**

[0030] **Figure 9A** illustrates a tab and label magazine with tabs **58a** through **58v**;

[0031] **Figure 9B and Figure 9C** illustrate a tab and label magazine;

[0032] **Figure 10A** illustrates an indexing means comprising a slot and post;

[0033] **Figure 10B** illustrates an indexing means comprising a slot and key; and

[0034] **Figure 11** illustrates a tab and label feeding means comprising a piston assembly.

Detailed Description of the Invention

[0035] The preferred embodiment herein disclosed is not intended to be exhaustive or limit the application to the precise form disclosed. Rather it is intended to enable others skilled in the art to utilize its teachings.

[0036] Referring now **Figure 1**, tab and label stapler apparatus includes a common staple gun **10** having a tab and label feeding attachment **20** connected thereto. Optionally, front guide assembly **40** is attached to the staple gun **10**. The front guide assembly permits accurate positioning of the staple gun against the product and allows the user to slide the staple gun parallel to the direction of the tab or label without marring or disturbing the finish of product, tab or label.

[0037] Staple gun **10** is a common staple gun and is available from a number of

manufacturers including ATRO, Behrens, Carton Closer Tools, Duo-Fast, Fasco, Jamerco, Josef Kihlberg (JK), Hitachi, ITW Paslode, SENCO, Spotnails, Stan-Tech, Stanley Bostitch, Unicatch. Staple guns may be pneumatically, electrically or manually actuated. Electrically actuated staple guns may also utilize electrical storage battery for the source of power. Particularly preferred for high cycle use are the pneumatically operated staple guns.

[0038] The staple gun depicted in **Figure 1** through **Figure 5** is a Behrens 380/16-400 series staple gun. It will be readily apparent to those skilled in the art how the invention is assembled to other common staple guns. According to this embodiment, tab and label feeding attachment **20** is highly compact. As used herein, "highly compact" refers to extending less than 0.5 inches past any side of staple gun means **10** or side of a planar material segment, extending less than 0.5 inches below staple gun means **10** when the contactor is compressed and extending less than 1.0 inch below staple gun means **10** when the contactor is released.

[0039] The construction and operation of staple gun **10** is common in the industry and does not constitute a novel portion of the invention. Preferred staple guns are as illustrated in **Figure 2** with extended stapling head **11** protruding below the base of the gun. Such staple guns have a dimension "**A**" of 25 mm or greater. As is further described below, the number of labels or tabs that can be held in a tab and label magazine is affected by this dimension.

[0040] In a preferred embodiment, the tabs and labels suitable for use with this invention are either in the form of "planar material segments" or "separable planar material segments" as opposed to continuous rolls or tapes that must be cut to a desired length. As a result, the apparatus of the present invention is simplified and a segment cutting means is not required. Planar material segments are individual pieces of material that are not interconnected. Separable planar material segments are planar material segments connected by weakened areas. The weakened areas allow the topmost tab or label to separate when it is positioned for stapling.

[0041] As used herein "tab and label feeding attachment" refers to a staple gun

attachment apparatus useful for feeding either tabs or labels with adjustments made to accommodate the tab or label being used. As used herein "tab feeding attachment" refers to a staple gun attachment apparatus useful for feeding tabs but not labels. Whereas labels are used primarily to identify products, tabs are used primarily to secure protective coverings with reduced staple pull through. In general tabs and labels are distinguished by their thickness. Tabs have a thickness in excess of 0.015 inch and preferably a thickness between 0.025 and 0.050 inches. Labels may be much thinner, for example 0.010 inch or less as they do not necessarily provide for reduced staple pull through.

[0042] Tab and label feeding attachment **20** in the figures is attached to staple gun **10** by means suitable for the staple gun. For example, in the case of a Behrens staple gun with a rail flange, the feeding attachment may be assembled to the gun using capturing flanges **22** and setscrews **23**.

[0043] Tab and label feeding attachment **20** includes a main housing **21** which holds tab and label magazine **50**, as illustrated in **Figure 3A** and **Figure 3B**. It further comprises tab and label indexing mechanism (depicted generally as **24**). Indexing mechanism **24** may be any means that feeds a label or tab to a position under the stapling head **11**. In one preferred embodiment, the indexing mechanism consists of a plunger **24**, gear assembly (not shown), torsion spring assembly (not shown) and indexing slide **26**. As plunger **24** is depressed against the spring return, the cam assembly advances indexing slide **26** thereby feeding a label or tab to the desired position. When pressure is removed from plunger **24**, it is returned to the extended position by the spring return. Simultaneously, indexing slide **26** returns to its original position by the action of the cam assembly. In this fashion, a single label or tab is fed to underneath staple gun head **11** each time the plunger **24** is depressed and released.

[0044] Although the preferred embodiment utilizes a gear assembly and torsion spring assembly, this is in no way limiting. For example, other means of mechanically linking the indexing slide to the plunger action are possible. One such means is a cam arrangement where as plunger **24** is depressed indexing

slide **26** advances. Another such means is a slot and post or slot and key. Further a gear assembly may use a worm gear, rack and pinion, or a piston assembly.

[0045] As is seen in **Figure 3B**, both plunger **24** and guide **40** may be equipped with rollers **25** and **41**. These rollers are not essential to the invention and may be omitted if desired. When supplied, they act to reduce friction between the product or protective wrap and the staple gun apparatus. Rollers **25** and **41** are preferred when the product or protective packaging is easily damaged.

[0046] Of importance is the thickness of indexing slide **26**. Indexing slide **26** is typically manufactured to a thickness slightly less than that of a single label or tab. As a result, as indexing slide **26** extends, a single label or tab will be positioned, with other labels or tabs remaining undisturbed in magazine **50**.

[0047] **Figure 3C** illustrates one embodiment of locking a tab and label magazine **50** into housing **21**. Magazine lateral supports **54** are captured in the housing channel **27**. Various means and arrangements can be used to lock the magazine into place. For example, a protuberance in the channel **27** past which lateral supports **54** must pass when magazine **50** is inserted is one preferred embodiment. Other convenient means of attachment are readily apparent to those skilled in the art and intended to be within the scope of the invention.

[0048] It is noted that the tab and label magazine may also be incorporated into housing **21**. In such embodiments, tabs or labels are loaded directly into the tab and label feeding attachment. Resulting feeder attachments operate in accordance with other embodiments described herein with the exception that the magazine is not separate or removable.

[0049] **Figures 4A, 4B, 4C** and **4D** illustrate the various components of one preferred embodiment of a tab and label magazine. A magazine may incorporate a magazine housing **51**, one or more coil springs **56** (see **Figure 4B**), pusher plate **57** (see **Figure 4C**) and labels or tabs to be contained (for example **58a** through **58r** of **Figure 4D**).

[0050] **Figur 4A** illustrates one embodiment of a magazine housing **51**. The magazine housing may be manufactured of any convenient material, for example, polymers, metals, etc. **Figure 4A** illustrates the use of polypropylene, but other polymers are equally suitable and include, without limitation, polyethylene, polypropylene, acrylonitrile-butadiene-styrene (ABS), polyamides, polytetrafluoroethylene, linear polybut-1-ene, polyisoprene, polybutadiene, ethylene-alkyl acrylate copolymers, ethylene-alkylmethacrylate copolymers, ethylene-vinylacetate copolymers, ethylene-acrylic acid copolymers, polystyrene, styrene-butadiene, styrene-acrylonitrile (SAN), styrene-ethyl methacrylate, styrene-butadiene-ethyl acrylate, styrene-acrylonitrile-methacrylate, methylmethacrylate-butadiene-styrene (MBS), polyvinyl chloride, polyvinyl fluoride, polyvinylidene fluoride, polyacrylates, polymethacrylates, polyacrylamides, polyacrylonitriles, polyvinyl alcohol, polyvinyl acetate, polyurethanes, polyureas, polyphenylene ethers, polyesters, polycarbonates, polyoxymethylenes, polysulfones, polyether sulfones, polyether ketones, etc.

[0051] As illustrated in **Figure 4A**, magazine housing **51** comprises an open area to contain labels or tabs, tab and label capturing elements **52, 53** and lateral supports **54**. Tab and label capturing elements have upper flanges that extend inward to hold the labels or tabs. Capturing elements preferably also flex outward to allow for easy insertion of labels or tabs. The height of the flange above the base of the magazine housing correlates with staple gun dimension **A** (see **Figure 2**). With magazine **50** inserted into feeder housing **21**, the bottom of these flanges is extending beyond dimension **A** by 125% to 150% of the thickness of a label or tab. Magazine housing 51 may also comprise indentations **55** that accept coil springs and resist spring movements caused from vibrations during operation.

[0052] **Figure 4B** illustrates the placement of a single coil spring **56** inside a magazine housing **51**. As illustrated, one, two or three coil springs may be utilized. It is preferable that coil spring **56** compress into a low profile as a lower profile allows more labels or tabs to be inserted into a single magazine.

[0053] **Figure 4C** illustrates the placement of pusher plate **57** inside a magazine housing **51**. As illustrated, pusher plate **57** restrains two coil springs **56**,

although other numbers of coil springs will also function properly. Pusher plate **57** is preferably tapered on each lateral end. When the magazine is empty of labels and tabs, engagement between indexing slide **26** and pusher plate **57** is thereby avoided. Tapered ends of pusher plate **57** also reduce snagging between pusher plate **57** and labels or tabs. Pusher plate **57** is restrained inside magazine housing **51** by flanges on tab and label capturing elements **52** and **53** (illustrated in **Figure 4A**). Preferably pusher plate **57** has an upper flat surface. A flat surface holds the labels or tabs in a flat condition and further minimizes snagging.

[0054] **Figure 4D** illustrates a tab and label magazine loaded with labels or tabs **58a** through **58r**. The number of labels or tabs depends upon the thickness of the tabs and dimension A of the staple gun. The thinner the labels or tabs and the larger dimension **A**, the greater the number of labels or tabs that are contained in a given magazine **50**. For example, for a dimension of **A** associated with a standard Behrens Model 380 staple gun, approximately 18 tabs of thickness 0.035 inches are held in the tab and label magazine. If tab thickness is reduced to 0.025 inches, the number of tabs the magazine can hold increases to 25. In either case, the indexing slide thickness must be comparable with tab thickness.

[0055] **Figure 9A** illustrates another embodiment of a magazine housing. This embodiment differs by the way in which tabs are filled into the resultant label and tab magazine. When using the magazine housing of **Figure 4A**, tabs are filled into the magazine by pressing them into the magazine from the top. In the embodiment of **Figure 9A**, tabs are filled into the magazine from the end.

[0056] **Figure 5A** illustrates the single-handed operation of one preferred embodiment of the present invention. The staple gun apparatus is located against the product to which the label or tab is to be affixed. Conveniently, the front edge of roller guide may correspond to the final front edge of the affixed label or tab. Next, plunger **24** is compressed against the product. As plunger **24** compresses, the cam assembly slidably feeds a single label **58a** forward to under the staple gun head **11**. Pressing trigger **12** initiates the expulsion of a staple through the label or tab into the product.

[0057] Next the staple gun head is moved parallel to the label or tab and trigger **12** is pressed, thereby affixing the label or tab to the product with additional staple(s). When provided, rollers **25** and **41** aid in moving the staple gun head parallel to the label or tab. **Figure 5B** illustrates the result of the operation of the staple gun apparatus.

[0058] As is seen, the invention provides a convenient and economical means of affixing a label or tab to a product with multiple staples in a single-handed operation. The apparatus can be fashioned by adding an accessory to a standard staple gun or by integrating the design into the frame of a staple gun.

[0059] When desired a printing device can be incorporated into the front guide assembly **40**. This permits the printing of serial numbers onto the labels or tabs as they are affixed to the product.

[0060] **Figure 6** illustrates another embodiment of the tab and label feeding attachment. Major components include housing structure **21a**, front housing structure **21b**, retaining covers **21c and 21d**, and tab indexing mechanism comprising plunger **24**, contact roller **25** and indexing slide **26**. **Figure 7A** has retaining cover **21d** removed to reveal additional features. Subsequent figures illustrate the components of this tab and label feeding attachment in greater detail.

[0061] In contrast to the earlier described embodiment, this embodiment uses a tab and label pressure spring **56** that is fixedly attached to the feeding attachment instead of being incorporated into a tab and label magazine. Fixing the spring to the attachment allows for reduced complexity and manufacturing costs of the magazine as well as increased capacity of the magazine. For example, this embodiment allows the magazine to hold 22 tabs of thickness 0.035 inch instead of 18 tabs of the earlier described embodiment.

[0062] Housing support structure **21a** illustrated in **Figure 7B** identifies features useful in a tab and label feeding attachment of high durability, longevity and simplified field maintenance. Slots **21a-1** constrain the indexing slide arms. The indexing slide arms are held inside slots **21a-1** by housing retaining covers **21c** and **21d**. Additional cutouts **21a-10** in slots **21a-1** provide for indexing

slide movement. The housing support also has circular holes **21a-2** having at least two different diameters. The smaller diameter provides clearance for a gear shaft. The larger diameter provides a "shelf" to support the indexing slide gears and also acts as a lubricant reservoir. Housing support structure area **21a-3** provides a channel into which the contacting plunger is depressed. This area may optionally include pins **21a-4** that further direct the vertical direction of the plunger and prevent side wear on area **21a-3**.

[0063] Added to the housing support structure are means for fixing the tab and label pressure spring **56**. In this example, slots **21a-5** are illustrated. Alternately, holes may be provided to capture ends of the spring. Although slots **21a-5** are illustrated as extending through the complete thickness of the housing, this is not required. When the housing is formed by machining an extrusion, it is convenient to machine the slots from the exterior, and therefore extend through the complete thickness. If the housing structure is instead precision cast, slots **21a-5** may be revised to indentions on the interior portions of the housing.

[0064] The housing structure **21a** has features to allow the easy insertion, retention and removal of a magazine. Slots **21a-7** allow the magazine tabs to extend outside the housing. Slots **21a-6** accommodate an anchoring feature of the magazine. In this example the magazine anchoring feature is a linear tab that is depressed then expands into the slot. Slots **21a-6** are modified when the magazine anchoring feature changes. For example, holes are useful for circular anchoring features of a magazine.

[0065] The housing also provides for attachment to a staple gun means and other components of the tab and label feeding attachment. Four drilled and tapped holes **21a-8** are used for attaching to a staple gun by using setscrews. Other fastening means such as detent pins or other fasteners could similarly be used. Similarly, holes **21a-9** are drilled and tapped for attaching various components. For example two to six holes may be used to attach retainer covers **21c** and **21d**. In addition, holes are drilled and tapped for attaching front housing structure **21b**.

[0066] **Figure 7C** illustrates housing retaining covers **21c** and **21d**. Covers include a relatively large planar face and tabs provided perpendicular thereto. The tabs act to restrain indexing slide arms within the slots of the housing support structure (see **Figure 7B**, slots **21a-1** with cutouts **21a-10**). As can be seen in Figure 7C retaining covers 21c and 21d have cutouts and holes corresponding to attachment features of the housing support structure. For example, tabs have cutouts for the indexing slide and magazine retaining tabs. Holes correspond to attachment holes for the retaining covers as well as set screws used to affix the housing support structure to the staple gun means.

[0067] **Figure 7D** and **Figure 7E** illustrate the tab and label pressure spring **56** of this embodiment. **Figure 7D** is an isometric view and **Figure 7E** is a plan view. Pressure spring **56** consists of a traditional spring 56c integral with a support base **56a**. The support base **56a** is configured to adapt to spring anchoring means in the housing support structure. For example, spring **56** as shown, adapts to slots **21a-6** of **Figure 7B**.

[0068] **Figure 7E** is a plan view of pressure spring **56**. Of importance is the fact that spring **56** compresses to a single wire thickness. This allows for the maximum number of labels or tabs in the accompanying magazine.

[0069] Front housing structure **21b** is illustrated in greater detail in **Figure 7F**. Holes **21b-1** attach front housing structure 21b to the housing support structure. Cutouts **21b-2** on the face mirror features on the staple gun means. As shown, cutouts **21b-2** mirror features on a Behrens staple gun means. By varying the cutouts, the tab and label feeding apparatus is adapted to large numbers of different staple gun means. On the back of front housing structure **21b** is a bevel **21b-3**. This bevel aids in feeding of labels and tabs.

[0070] The components of the tab and label feeding means of this embodiment are illustrated in **Figures 8A** through **8C**. As seen in **Figure 8A**, gears **32** and **33** mesh with indexing slide arms **31** and contacting plungers **24**. Gears **32** and **33** may be combined into a single gear or be a pair of gears that are fixedly attached to one another. Two sets of gears are provided, one set for each indexing slide arm. While a single set of gears is sufficient, using two sets

improves slide travel and reduces binding of the slide arms.

[0071] The diameter ratio between gear **32** vs. gear **33** controls the amount of travel of indexing slide **26**. Increasing gear **32** diameter, relative to gear **33** diameter, increases slide **26** travel. The sets of gears are connected with a gear shaft that is not visible due to the presence of torsion spring **34**. Torsion spring **34** is threaded through a hole in the gear shaft and returns indexing slide **26** to a home position when contacting plungers **24** are released.

[0072] Contacting plungers **24** and contacting surface **25** may be a single integral component, or a combination of separate components. As illustrated, contacting plungers are connected with a roller shaft that supports a roller as contacting surface **25**. Using a roller as contacting surface **25** reduces cuts and damage to protective coverings. Suitable rollers may be manufactured of virtually any machinable or castable material including aluminum, nylon, polypropylene, polyethylene, wood, and the like.

[0073] One surface of each contacting plunger **24** is provided with a rack that meshes with gear teeth of gears **33**. As the plunger moves upward, gears 33 rotate in a counter-clockwise rotation. The rotation of gears **33** is then communicated to gears **32** that are fixedly attached to gears **33**. The rotation of gears **32**, in turn, is communicated to the rack of the indexing slide arms, giving a resultant planar motion, perpendicular to the movement of contacting plungers **24**. Torsion spring **34** resists the rotation of the gears and causes the gears to rotate in a clockwise direction when contacting plungers **24** are released. The spring tension of torsion spring **34** is selected to provide adequate force to return the indexing slide to its home position. At the same time the spring tension is limited so that excessive force is not required to depress contacting plungers **24**.

[0074] **Figure 8B** and **Figure 8C** illustrate the indexing slide and indexing slide arms in greater detail. As shown in **Figure 8B**, indexing slide **26** may be separately fabricated and attached to indexing slide arms **31**. As an alternate, indexing slide 26 and slide arms **31** may be fabricated as a single component. As shown, indexing slide arms **31** are fabricated with a gear rack that meshes

with gears of the tab and label feeding means. When slide arms 31 are separately fabricated, they may be connected to indexing slide by any means common in the art. As shown for illustration and not as a limitation, a dovetail joint is provided with a dovetail slot fabricated into each slide arm **31** and mating dovetail pins fabricated into indexing slide **26**. Dovetail joints may have a positive tolerance to allow the indexing slide to "float" between the two slide arms.

[0075] **Figure 8C** is a view from underneath indexing slide **26** with an enlarged cross-section of the slide also depicted. As also shown in **Figure 8B**, this example of an indexing slide has dovetail pins **26a** that allow a floating connection to the indexing slide arms. Preferably the indexing slide front edge is fabricated with two surfaces **26b** and **26c**. Even more preferable is the inclusion of a third surface **26d**. Surface **26b** is the portion of the indexing slide that contacts the edge of the tab or label and is approximately perpendicular to the movement of the indexing slide (e.g. 80-90 degrees).

[0076] Surface **26c** is the front most surface of indexing slide **26** and is angled to encourage a tab or label to seat itself against surface **26b**. The addition of surface **26c** reduces occasions of not feeding a tab or label. It has been found that surface **26c** functions well with tabs when it is at an angle of 15-45 degrees (measured from the movement direction of the slide).

[0077] In order to reduce instances of feeding more than a single tab or label, surface **26d** may also be added to indexing slide **26**. A flatter angle is preferred for surface **26d**. For example, an angle of 15 to 30 degrees has proved advantageous for feeding tabs.

[0078] **Figure 9A through Figure 9C** illustrate various views and features of a filled magazine **50** suitable for use with this embodiment of the invention comprising a magazine housing **51** and tabs **58a through 58v**. Twenty-two tabs having an individual tab thickness of 0.035 inches are accommodated by this particular magazine housing **51**.

[0079] **Figure 9B and Figure 9C** show various isometric views of the same magazine housing **51**. In contrast to the tab and label magazine of the first

exemplary embodiment, this magazine uses magazine housing **51** without either a pusher plate or coil springs. Lateral supports **54** are used to anchor the magazine into the tab and label feeding apparatus. Uppermost lip **54b** clamps into corresponding slot **21a-6** of **Figure 7B**. When horizontal extensions **54a** are compressed, the magazine is released from the feeding apparatus. Pressure spring **56** of **Figure 7B** aids in removal of an empty magazine.

[0080] **Figure 9B** makes visible the top of outermost surface of magazine **51**. Between end retaining flaps **52a** is the opening that is most frequently used to fill the magazine with tabs or labels. Tabs are filled from this end and exit through the slot near feed retaining bar **52d**. Tabs are constrained in a relatively flat orientation by retaining tabs **52b**, outermost surface **52b**, main constrainer **52C** and feed retaining bar **52d**. **Figure 9C** shows the opposing innermost surface of magazine **51**. Of particular interest is open area **55** that allows the pressure spring to press tabs or labels against outermost surface **52b**, shown in **Figure 9B**.

[0081] The present invention may use various indexing means known in the art. For example, the first embodiment illustrates the use of a worm gear and the second embodiment illustrates the use of a rack and pinion.

[0082] **Figure 10A** and **Figure 10B** illustrate how slots in the contacting plungers are used as the indexing means. In **Figure 10A**, slot **24a** is provided in contacting plunger **24**. Post **31a** is integral or attached to slide arms **31** that are, in turn, attached to or integral with indexing slide **26**. Slide arms 31 have their movement constrained to the left-right directions. As contacting plunger 24 is depressed the indexing slide is forced forward by slot 24a acting on post 31a.

[0083] **Figure 10B** illustrates the use of key **31b** instead of a post. As contacting plunger **24** is depressed the indexing slide is forced forward by slot **24a** acting on key **31b**. The width of contacting plunger **24** and length of slot **24a** in **Figure 10A** and **Figure 10B** must accommodate the amount of forward travel needed for indexing slide **26**. In addition, the angle of the slot is adjusted for

the vertical travel of plunger **24**. The angle must also be sufficiently distinguished from horizontal to effect easy movement of the indexing slide. In general an angle of between 30 and 60 degrees is preferred.

[0084] **Figure 11** illustrates a tab and label feeding means comprising a piston assembly that is suitable for use in the invention. Pneumatic piston 74 operates on air pressure applied and vented through tubing **73**. Air valve **72** is connected via tubing **71** to pressurized air supply. Preferably, pressurized air supply is obtained from staple gun means air supply.

[0085] When contacting plunger **24** is depressed, it presses on air valve trigger plunger **72b** causing pressurized air to flow from air valve inlet **72a** to air valve outlet **72c**. Pressurized air causes piston **74** arm **74a** to extend that in turn extends indexing slide **26** connected with connector **74b**. As illustrated, connector **75b** is a threaded connection that may optionally use locknuts **74**. Other types of connectors may be used as know in the art.

[0086] When contacting plunger **24** is released, the piston returns to its home position, which retracts indexing slide **26**. Piston **74** is secured in the label and tab feeding attachment with brackets **75**. Piston **74** and air valve **72** operate independently of the staple gun thereby allowing the staple gun means to be used without stapling into a tab or label.

[0087] Another variation of using a pneumatic piston assembly as the tab and label feeding means is to mount air valve **72** to the handle of the staple gun means. In this variation, the operator would press air valve plunger **72b** directly, thereby eliminating contacting plunger **24**. After a tab or label is fed, the staple gun means would then be separately activated.

[0088] When used with "lumber wrap" protective coverings, the present invention is particularly useful. Preferably lumber wrap is secured with staples and tabs. It is often desirable that the tabs be a similar material as the lumber wrap in order to facilitate recycling. Typical tabs for securing lumber wrap are from 0.015 to 0.050 inches thick with planar dimensions large enough to reduce over 90% of staple pull-throughs. For example, planar dimensions greater than or equal to 0.75 inches square are suitable.

[0089] Larger planar dimensions are advantageous in bridging separate lumber pieces incorporated into a single lumber product package. For example, planar size of 1 inch by 2 inches both prevents staple pull throughs and is adequate for bridging. By varying the dimensions of the tab and label feeding attachment, the invention can be used with tabs having dimensions of from 0.75 to 1.5 inches in width and from 0.5 to 6.0 inches in length.

[0090] The present apparatus permits stapling the lumber wrap to a wood unit product with an indexed tab as well as without a tab. This is apparent as tabs are only indexed when the contacting plungers are depressed. The staple gun means continues to function normally when the plungers are note depressed and a tab is not indexed. Being able to use the staple gun means without indexing a tab conserves the number of tabs used. Many suppliers of lumber wrap incorporate reinforced areas for stapling. When the reinforced areas correspond to a convenient stapling area, a stapling tab may be avoided. However, as the reinforced areas inevitably do not correspond to all needed stapling areas, a certain number of tabs must be used. Users of the invention can conveniently staple reinforced areas without tabs and then staple un-reinforced areas with tabs.

[0091] Just as the staple gun means can be used without a tab, it can also be used to apply multiple staples in and through a single tab. Typically, a tab is indexed by depressing the contacting plunger and the staple gun is triggered, driving a first staple through the tab, through the lumber wrap and into the wood product. The staple gun is next positioned in a new location and a second staple is driven through the same tab, lumber wrap and into the wood product. In order to not feed a second tab, the staple gun is repositioned without releasing the plungers or with releasing the plungers but keeping the plungers released. If desired a third, fourth, or higher numbered staple may be similarly driven. This ability of using multiple staples on a single tab, allows tabs to better secure protective coverings, allows tabs to bridge separate pieces of a product and reduces the number of tabs used in securing a protective covering.

[0092] Although the present invention has been described in terms of specific embodiments, other variations can be made as will be known to those skilled in

the art. For example, the accessory and roller assembly can be combined into a single unit or fully integrated into a staple gun. Similarly, materials other than those illustrated may be used in fabrication of the apparatus. The scope of the invention is only to be limited by the following claims: